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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/800,366	03/06/2001	Roland A. Wood	H0001512 (256.087US1)	3295

128 7590 05/29/2002

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EXAMINER

LEE, SHUN K

ART UNIT	PAPER NUMBER
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2878

DATE MAILED: 05/29/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	09/800,366		WOOD, ROLAND A.	
	<b>Examiner</b>		<b>Art Unit</b>	
	Shun Lee		2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 March 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All   b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>2</u> . | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

### ***Drawings***

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: 370 (Fig. 3), 470 (Fig. 4), and 940 (Fig. 9). A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Claim Objections***

3. Claims 9 and 10 are objected to because of the following informalities:

(a) on lines 1-2 in claim 9, "electrical bias pulses" should probably be --bias pulses--;

and

(b) on line 1 in claim 10, "resulting electrical signals" should probably be --resulting signals--.

Appropriate correction is required.

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***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-5, 7, 9-17, 20, and 22-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Wood *et al.* (US 5,675,149) and incorporated by reference US Patent 5,420,419 (Wood).

In regard to claim 14, Wood *et al.* disclose an infrared radiation detector apparatus, comprising:

- (a) microbolometers in an array (column 5, line 65 to column 6, line 1);
- (b) a timing circuit coupled to the array to apply two or more bias pulses substantially sequentially to each of the microbolometers in the array in each frame time (US 5,420,419 column 6, lines 18-34);
- (c) a measuring circuit coupled to the array to measure two or more resulting signals associated with each of the applied two or more bias pulses during the frame time (column 5, lines 47-53);
- (d) a computing circuit coupled to the measuring circuit to compute an average signal value for each of the microbolometers in the array from the measured two or more resulting signals during the frame time (column 5, lines 47-53).

In regard to claim 1, the method steps are implicit for the apparatus of Wood *et al.* since the structure is the same as the applicant's apparatus of claim 14.

In regard to claim **2** which is dependent on claim **1**, Wood *et al.* also disclose (column 1, lines 55-58) recording and displaying IR images. Inherent in the formation of images is repeating the applying, measuring, computing, and producing steps to produce output signals during each frame time in order to form an IR image.

In regard to claim **3** (which is dependent on claim **2**) and claim **16** (which is dependent on claim **14**), Wood *et al.* also disclose (column 4, lines 5-24) that the measuring circuit further comprises a correction circuit to apply a corrective electrical signal to the signals to correct for resistance non-uniformity between the microbolometers of the array to obtain a substantially uniform output signal value.

In regard to claim **4** (which is dependent on claim **3**) and claim **15** (which is dependent on claim **14**), Wood *et al.* also disclose (column 2, lines 57-59) that the measuring circuit further comprises an integrator (integrating preamplifiers 26) and an A/D converter (32) to convert the output signal values to a digital signal values.

In regard to claim **5** which is dependent on claim **4**, Wood *et al.* also disclose (column 4, lines 5-24) passing the digital signal values associated with each of the microbolometers in the array to a digital image processor to perform computations and substantially remove image defects.

In regard to claim **7** (which is dependent on claim **1**) and claim **20** (which is dependent on claim **14**), Wood *et al.* also disclose (US 5,420,419 Fig. 6 and column 6, lines 18-34) that the bias pulses are substantially equal in magnitude.

In regard to claim **9** (which is dependent on claim 1) and claim **22** (which is dependent on claim 14), Wood *et al.* also disclose (US 5,420,419 Fig. 6 and column 2, lines 17-20) that the two or more applied bias pulses comprise voltage bias pulses.

In regard to claim **10** (which is dependent on claim 1) and claim **23** (which is dependent on claim 22), Wood *et al.* also disclose (US 5,420,419 column 7, lines 26-28) that the resulting signals comprise current signals.

In regard to claim **11** (which is dependent on claim 1) and claim **24** (which is dependent on claim 14), Wood *et al.* also disclose (column 5, lines 47-53) that multiple measurements and averaging of sensor signals is equivalent to long exposures. Inherent in an average is at least two sensor signals each associated with an applied bias pulses and thus there are in the range of about 2 to 100 bias pulses dependent on the length of the exposure.

In regard to claim **12** (which is dependent on claim 1) and claim **25** (which is dependent on claim 24), Wood *et al.* also disclose (US 5,420,419 Fig. 6 and column 6, lines 18-34) that the two or more bias pulses have time duration in the range of about 0.1 to 20 microseconds (*e.g.*, 5-6  $\mu$ s).

In regard to claim **13** (which is dependent on claim 1) and claim **26** (which is dependent on claim 14), Wood *et al.* also disclose (column 5, lines 47-53) that multiple measurements and averaging of sensor signals is equivalent to long exposures. The exposure time (*i.e.*, frame time) is inherently the time it takes for the array to produce a complete image of an object being viewed by the array.

In regard to claim **17** which is dependent on claim 14, Wood *et al.* also disclose (column 4, lines 35-40) that the computing circuit further comprises computing means to produce output signals based on the computed average signal value for each of the microbolometers in the array during the frame time.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 6, 18, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood *et al.* (US 5,675,149) and incorporated by reference US Patent 5,420,419 (Wood) in view of Thiede *et al.* (US 5,129,595).

In regard to claim **6** (which is dependent on claim 5) and claim **18** (which is dependent on claim 17), the infrared radiation detector apparatus and method of Wood *et al.* lacks that the computing circuit further corrects the output signal values for image defects comprising fine offsets, gain non-uniformity, and dead pixels. Image defects such as fine offsets, gain non-uniformity, and dead pixels are well known in the art. For example, Thiede *et al.* teach (column 7, lines 45-66) the correction of gain non-uniformity and dead pixels in order to fully compensate for array non-uniformity. Therefore it would have been obvious to one having ordinary skill in the art to correct for gain non-uniformity and dead pixels in the infrared radiation detector apparatus and method of Wood *et al.*, in order to fully compensate for array non-uniformity.

In regard to claim **19** which is dependent on claim 18, Wood *et al.* also disclose (column 4, lines 5-24) that the computing circuit further comprises digital memories to store correction values for each of the microbolometers in the array.

8. Claims 8 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood *et al.* (US 5,675,149) and incorporated by reference US Patent 5,420,419 (Wood) in view of Duvall, III (US 5,258,619).

In regard to claim **8** (which is dependent on claim 1) and claim **21** (which is dependent on claim 20), the infrared radiation detector apparatus and method of Wood *et al.* lacks that the bias pulses are substantially equally spaced in time. Duvall, III teaches (column 6, lines 43-53) a swept bias technique includes adjusting the waveform parameters of rise-time, fall-time, peak to peak values, time between pulses, pulse slope, pulse width, and pulse amplitude that best meets a given detector and design situation in order to minimize unwanted detector heating. Therefore it would have been obvious to one having ordinary skill in the art to adjust the bias pulses waveform parameters (e.g., pulses are substantially equally spaced in time) in the infrared radiation detector apparatus and method of Wood *et al.*, in order to meet a given detector and design situation so as to minimize unwanted detector heating as taught by Duvall, III.

### **Conclusion**

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patent 5,196,703 (Keenan) discloses a mode of operation for a bolometer array comprising a series of bias pulses within 1 frame.



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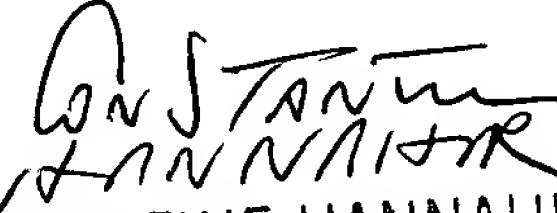
10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shun Lee whose telephone number is (703) 308-4860.

The examiner can normally be reached on Tuesday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on (703) 308-4881. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

SL  
May 23, 2002

  
CONSTANTINE HANNAHER  
PRIMARY EXAMINER  
GROUP ART UNIT 2878